CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1. A computerized method for providing an optimization solution, said method comprising:

for a process, wherein is defined a linear functional form $y = f(X,c)$, where X comprises a set of independent variables $X = \{x_1,...x_n\}$, c comprises a set of functional parameters $c = \{c_1,...c_n\}$, and y comprises a dependent variable, where the independent variables set X is partitioned into two subsets, X_1 and X_2, receiving data for said process;

minimizing y with respect to X_1; and

maximizing y with respect to X_2, subject to a set of constraints, wherein said maximizing y comprises a global optimum for said process.

2. The method according to claim 1, further comprising:

reformulating said process as a sequence of linear minimization problems.

3. The method according to claim 2, further comprising:

generating new constraints to refine the problem formulation for said maximizing.

4. The method according to claim 3, wherein the method iteratively adds and manages the newly generated constraints to reoptimize the problem to global optimality.

5. An apparatus for calculating a global optimization to a minimum-maximum problem, said apparatus comprising:

a first calculator to provide a plurality of minimum values; and

a second calculator to locate a global optimum value, given said plurality of minimum values.

6. The apparatus of claim 5, wherein at least one of said first calculator and said second calculator comprises a linear programming solver.

7. The apparatus of claim 5, further comprising:

a memory interface to access a memory containing data; and

a third calculator to convert the data accessed from said memory into a data structure appropriate for said first calculator and said second calculator.

8. A system comprising:

a memory containing data appropriate to a minimum-maximum problem; and

an apparatus comprising:

a first calculator to provide a plurality of minimum values; and

a second calculator to locate a global optimum value, given said plurality of minimum values.

9. A signal-bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform a method for providing an optimization solution, said method comprising:

for a process, wherein is defined a linear functional form $y = f(X,c)$, where X comprises a set of independent variables $X = \{x_1,...x_n\}$, c comprises a set of functional parameters $c = \{c_1,...c_n\}$, and y comprises a dependent variable, where the independent variables set X is partitioned into two subsets, X_1 and X_2, receiving data for said process;

minimizing y with respect to X_1; and

maximizing y with respect to X_2, subject to a set of constraints, wherein said maximizing y comprises a global optimum.

10. The signal-bearing medium according to claim 9, said method further comprising:

reformulating said process as a sequence of linear minimization problems.

11. The signal-bearing medium according to claim 10, said method further comprising:

generating new constraints to refine the problem formulation for said maximizing.

12. The method according to claim 11, wherein the method iteratively adds and manages the newly generated constraints to reoptimize the problem to global optimality.

13. A business method, comprising at least one of:

for a process, wherein is defined a linear functional form $y = f(X,c)$, where X comprises a set of independent variables $X = \{x_1,...x_n\}$, c comprises a set of functional parameters $c = \{c_1,...c_n\}$, and y comprises a dependent variable, where the independent variables set X is partitioned into two subsets, X_1 and X_2, receiving data for said process for a computerized calculation to find a global maximum for said process, said calculation minimizing y with respect to X_1 and

maximizing y with respect to X_2, subject to a set of constraints, wherein said maximizing y locates a global optimum for said process;

providing a data for said process, said data to be used in said computerized calculation for said global optimum;

receiving a result from said computerized calculation;

providing one or more software modules for said computerized calculation; and

developing one or more software modules for said computerized calculation.

14. A computerized tool for providing a global solution to a minimum-maximum problem, said tool comprising:

a linear programming solver to calculate a periphery of a polyhedron representing a region of all points that satisfy a linear constraint in a minimum-maximum problem.

15. The computerized tool of claim 14, wherein said linear constraint is $A_{12}x_1+A_{21}x_2 \leqq b_{12}$, where A_{12}, A_{21} are sub-matrices and b_{12} is a vector, and data is provided for a function $y = f(x,c) = c_1x_1 + c_2x_2$, where x is a set of independent variables $x = \{x_1,x_2\}$, x_1 and x_2 are subsets of x, $c = \{c_1,c_2\}$ is a set of functional parameters, partitioned into two subsets c_1 and c_2, and y is a dependent variable,

said minimum-maximum problem to minimize (over x_2) the maximum (over x_1) of y, subject to said linear constraint.

16. The computer tool of claim 14, further comprising:

a data converter to fit data from a database into a data structure to populate a model for said minimum-maximum problem.

17. The computer tool of claim 14, further comprising:

a linear programming solver to determine a sensitivity vector C that defines an efficiency between said minimum and maximum parameters.

18. The computer tool of claim 14, further comprising:

a calculator to determine which point on said periphery provides a global solution to said minimum-maximum problem.

19. The computer tool of claim 17, further comprising:

a calculator to determine which point on said periphery provides a global solution to said minimum-maximum problem, using said sensitivity vector C.

20. The computer tool of claim 19, further comprising:

a calculator to calculate a 1-polar cut to divide said polyhedron into two regions and to determine which of said two regions said global solution lies, using said sensitivity vector C.